

service. Although it is some sixty years ago since a certain measure of medical inspection of school-children was initiated in Paris, and Great Britain has been so slow to adopt a provision the value of which has been appreciated by many other countries for many years, the work has been started in this country with such zeal and enthusiasm that we promise very shortly to have established throughout these islands a scheme which will compare favourably with that of any other country. But it is essential to the best results that there should be a better knowledge of the demands of school hygiene among medical men who are called upon to work in connection with the schools, and also among the teachers; and suitable manuals upon this subject are therefore of great value and importance. The present work is so suitable in many respects that it is to be hoped that in a future edition more explicit information upon many of the practical details of school hygiene, which are wanting in the present volume, will be included.

#### MODERN SCHOOL GEOGRAPHY.

- (1) *Narrative Geography Readers*. By G. F. Bosworth. Book i., pp. viii + 133; book ii., pp. viii + 145. (London: Macmillan and Co., Ltd., 1910.) Price 1s. each.
- (2) *A Systematic Geography of Europe*. By G. W. Webb. Pp. viii + 96. (London: Methuen and Co., 1910.) Price 1s.
- (3) *Narratives Selected from Peaks, Passes and Glaciers*. Edited by G. Wherry. Pp. iii + 156. (Cambridge: University Press, 1910.) Price 1s.
- (4) *Cambridge County Geographies: Cheshire*. By T. A. Coward. Pp. x + 207 + maps. (Cambridge: University Press, 1910.) Price 1s. 6d.
- (5) *An Elementary Practical Geography for Middle Forms*. By F. Mort. Pp. 91. (London: Blackie and Son, Ltd., 1909.) Price 2s.
- (6) *A School Economic Atlas*. By Dr. J. G. Bartholomew, with Introduction by Prof. L. W. Lyde. Pp. xii + 64. (Oxford: The Clarendon Press, 1910.) Price 2s. 6d. net.

A SET of new school books in geography suggests the possibility of finding from an examination of their contents the main lines along which instruction in this subject is tending at the present time to crystallise.

With a single exception the books named above differ considerably from those in school use ten to fifteen years ago: they suggest development in three directions, the first being that of the story told to beginners, the others, for older pupils, being the scientific methods of actual investigation by the pupil from the raw material of geographical records, and of considering the results of special study as placed together in a monograph, if such a word may be used in this modest connection, or of considering the actual experiences described by the traveller.

The single exception, Mr. Webb's "Systematic Europe" (2), recalls the old type of text-book, with its tit-bit collection of facts, of which the following is a specimen:—"Elche is famous for its date palms" (p. 32). Less than one-fifth of the book is given to a

general survey of the Continent, and the remainder is a fairly systematic treatment of the separate countries. Many of the facts seem to be unimportant; others are such as a good pupil might reasonably be expected to find out for himself from a modern atlas, provided he had had some little training in investigation. The attempts in the large-type matter to trace causal connections are not always happy, as, for example, in regard to the Gulf Stream, which is described as washing the western shores of Scandinavia, and to the Föhn effect, which is called a wind.

The "Narrative Readers" (1) set forth, in the first place, facts concerning the lives of children in other lands, and from the stories of their habits and surroundings the author passes to the stories of such interesting things as the whale fishery, Captain Cook's voyages, or the mutiny of the *Bounty*. The child is frequently referred to an atlas, but it would probably be better if the reference were to a globe which could be presented as a model of the earth.

At a certain stage of development it is more important that the child should be able to do things for himself than that he should memorise facts presented to him by an adult; and it is probable that no school subject provides a means for work of this nature so easily and so universally available as geography, hence the development of practical work in this subject. For this the main requirement is a good atlas, and the Clarendon Press is to be congratulated that the first venture in the provision of an atlas is one so likely to be largely adopted as the one under review (6). The child who works through the ample supply of material in the spirit outlined in Prof. Lyde's introduction will be well equipped as a thinker in terms of geography. From the point of view of scientific accuracy it would perhaps be helpful if some numerical values were added to the statistical diagrams relating to the main products of economic importance, and also that the values given should be either triennial or quinquennial averages; possibly future editions will be improved in these directions. Many additional facts are given in the introduction in a concentrated and technical language, presumably for the benefit of the teacher.

Before such an atlas can be used the pupil should have had some preliminary training in the making of similar maps, and for this purpose are provided for schools those books of practical geography of which Mr. Mort's is one example. Although it deals with contouring, with climate, and with vegetation, this book illustrates markedly the indefiniteness of the boundaries of school geography, for some of the earlier work suggested should probably be called observational nature-study, while much of the plane-tableing is surveying work which would, to many teachers, appear to be beyond the scope of a school course. Mr. Mort's book is not entirely "heuristic," as he tells many facts which the pupil might be expected to find out for himself.

It is not possible in practical exercises of this nature to cover the entire ground of geographical studies, and therefore the pupil is provided with two other kinds of text for reference or special study. The first

contains narratives by actual travellers, such as those edited by Mr. Wherry (3); these can be used as school readers, or can be set for home reading; this particular set deals with early climbs in the Alps. The second kind takes the form of a special study of a limited area, and the volume on "Cheshire" (4) illustrates the way in which the pupil may be brought into touch with the work of a specialist; such books should be in the geographical reference library. These works appear to typify the best efforts of modern teachers of geography.

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#### ELECTRICAL ENGINEERING.

(1) *Electrotechnics*. By Dr. John Henderson. Pp. xiv+165. (London: Longmans, Green and Co., 1909.) Price 3s. 6d.

(2) *Practical Testing of Electrical Machines*. By L. Oulton and N. J. Wilson. Pp. vi+210. (London: Whittaker and Co., 1909.) Price 4s. 6d. net.

1) **T**HE efficient organisation of students' work in an electrical engineering laboratory is a difficult task, and especially so with large elementary classes. Advanced students may be trusted with delicate instruments and left to arrange the necessary connections by themselves, they require little supervision, and as their number is small this is easily given. With elementary classes the case is different. It is obviously impossible to let all the men do the same tests simultaneously, since that would require multiplication of apparatus beyond the financial capacity of most institutions. Hence tests of different kinds must go on at the same time, and since the demonstrator cannot personally supervise every one of these different tests from its beginning, it is important that the students should get very clear instructions in print. It is also important so to arrange the tests that they shall, with students of average ability, take about the same time, and to arrange the work generally with the precision of a railway time-table, because otherwise students will drop out of their order and fail to get the full benefit of the course. All this, and the necessity to adapt the work to the class of students attending and to the equipment which happens to be available in any particular institution, tends to make the instruction somewhat cut and dried in character, and this is likely to detract from its educational value.

The author, who has evidently experience of these difficulties and the way to make the best compromise possible between conflicting requirements, has, in the third volume of this series of physical and electrical engineering laboratory manuals, given us an excellent guide to laboratory work of this kind. He does not believe in the use of special apparatus, but very rightly teaches his students to make the tests in the laboratory very much in the same way that they will have to adopt when they get into practical life, that is, by the use of ordinary commercial instruments. He also adopts the principle that tests must be so arranged that only two, or at the outside three, men are necessary for any one test.

The subject-matter is divided into three parts, which roughly correspond to the City and Guilds of London

syllabus for the "elementary stage" and the "ordinary grades" of direct and alternating current engineering. We thus get in the first part Ohm's law, the Wheatstone bridge, calibration of instruments, fuse testing, some simple magnetic tests, and experiments with a small motor. In the second part we come to heating of wires, potentiometric measurements, more advanced magnetic testing, characteristics of dynamos, secondary batteries, photometry, losses in dynamos, and so on. The third part deals mainly with the fundamental relations of alternating currents, graphic methods of representing these, and some very simple tests on alternators. Transformers and motors are not dealt with.

In an appendix are given mathematical and physical tables which will be found very useful, not only by the student, but also by the practical engineer. So far as the student is concerned, some of these tables should bring home to him a sense of reality of his work. Students are apt to consider their class-work as something purely scholastic and detached from practical life. If, then, a student, after having in his work found some physical fact such as the fusing current of a certain wire, the E.M.F. of a given cell, or the power per candle required by, say, an Osram lamp, and then turns to the tables at the end of this book to see how his determination agrees with the figures there given, he must get the impression that what he has done in the laboratory has practical importance, and this conviction will give him additional interest and pleasure in his work.

(2) This book is intended as a guide in testing electrical generators and motors. In the preface the authors point out that it is impossible to give "all the theory that the subject entails," and that the reader must therefore also consult some of the many textbooks. This is obviously right; nobody can expect to find in a book which is primarily an instruction how to test the whole of the theory of electrical machines, but some fundamental theories must be given, and in this respect the book falls short of what the reader has a right to expect. The authors give some sort of theory, but it is neither closely reasoned nor always clearly expressed. The latter defect may to some extent be due to their adoption of some terms which give one the impression of being a kind of technical jargon employed in a particular shop or laboratory, though not generally found in scientific books. For instance, if we are told to take a "locked saturation" it is not immediately obvious that we have to determine the relation between starting torque and voltage of an induction motor; nor is it very clear what a "pressed down reading on the scales with the power off" might mean. On p. 34 we read that "C.B. is the leakage current and proportional to the current in the motor." Further that it is "required to overcome the counter E.M.F. due to leakage."

These are of course merely unfortunate ways of expressing certain ideas which the authors have correctly in their minds, but it is irksome for the reader to have continuously to exercise his ingenuity in order to find out what it is the authors really mean. In some cases this task looks almost hopeless, as, for